Information Sheet on Per- and Polyfluoroalkyl Substances (PFAS) At NASA's Wallops Flight Facility

As of Feb. 15, 2023

Current Status and Actions

In continuing with our commitment to provide ongoing communication, this information sheet is an update on our ongoing efforts related to Per- and Polyfluoroalkyl Susbtances (PFAS) at NASA's Wallops Flight Facility.

We continue to test Wallops' finished drinking water and production wells for PFAS. We also continue to test the Town of Chincoteague's drinking water production wells and water entering the Town's water treatment and distribution system. Beginning in 2022, sampling of Wallops' drinking water and production wells along with the Town's deep wells moved form monthly to quarterly given more than five years of data showing nondetect or less than one part per trillion detections of PFOS and PFOA. The Town's shallow wells and finished drinking water are still sampled monthly. We continue to share all results with federal and state health and environmental agencies.

We remain committed to expanding our PFAS testing as additional analytical methods of detection are established and approved by the EPA. The EPA approved a new testing protocol to analyze for up to 29 PFAS compounds in drinking water, and we incorporated this new protocol into our testing procedures in February 2022. These analyses have shown sporadic, low-level detections of some of these additional PFAS compounds. With the EPA releasing a final health advisory on PFBS and GenX chemicals [see side bar above], it's important to note we have had no detections of GenX chemicals, with the expection of one detection of PFBS at 7.45 ppt in March 2018 that was not detected on immediate retesting or since. All tests are done using an independent certified laboratory for

Background

Since 2016, NASA, in collaboration with local, state, and federal agencies, has conducted routine testing of the facility's groundwater monitoring wells and drinking water wells and the Town of Chincoteague's drinking water wells for the presence of per- and polyfluoroalkyl substances (PFAS). These tests are being done because of historic fire training activities, dating from the late 1970s to 1988 located on the north-central portion of Wallops' main base. Firefighters conducted training with a commonly-used firefighting foam that contained PFAS compounds. The firefighting foam was also used to extinguish fires from an aircraft crash that occurred at Wallops in 1998.

To date, there are no federal or state drinking water, groundwater or surface water standards for PFAS. EPA announced its PFAS Strategic Roadmap in October 2021. The roadmap sets timelines by which EPA plans to take specific actions and commits to new polices to safeguard public health and protect the environment. We continue to track all federal and state agency efforts related to PFAS. We are aware that EPA recently released interim health advisories for PFOS and PFOA and final health advisories for PFBS and GenX chemicals on June 15, 2022. EPA's lifetime health advisories identify levels to protect all people, including sensitive populations, from adverse health effects resulting from a lifetime of exposure. NASA continues to monitor the EPA's work and guidance from other federal and state health and environmental agencies to guide our PFAS reponse.

analysis using EPA-approved methods, and the results are reviewed by state and federal health agencies, who advise NASA on what actions we should take to protect health.

Water Production – Taking Action

Wallops:

We are pleased to announce that installation of new water production well (Well #6) and associated infrastructure has been completed on the Wallops main base to supplement the existing well field that supplies drinking water to NASA and its tenant organizations on the main base. The well replaces Well #5, which was shut down in January 2019 after tests showed low concentrations of PFAS that were likely due to the age of the well and historic construction methods used. The new well went into operation Jan. 25, 2023.

Town of Chincoteague:

NASA began supplementing the Town of Chincoteague's drinking water with water from Wallops' finished drinking water in the spring of 2017 while at the same time evaluating groundwater treatment options to remove PFAS. NASA installed a groundwater treatment system using granular activated carbon (GAC), a proven technology for removing PFAS, enabling the Town of Chincoteague to resume use of its shallow wells and an additional deep well for water production. The Virginia Department of Health issued an operations permit for the system in March 2021, and the system went into full operation at the end of April 2021. **As of Jan. 31, 2023, the system has treated more than 77 million gallons of water.** Ongoing testing continues to show the system is performing as designed and effectively removing PFAS to below detection limits.

The system has a 410-gallon-per-minute capacity. The system has four tanks set up in pairs, and each tank contains 10,000 pounds of GAC, which is the material that adsorbs the PFAS. Each tank pair is set up in what's known as a "lead-lag configuration." The first (lead) tank removes PFAS and the second (lag) tank provides a final finishing step. Importantly, the lag tank also provides back up and redundancy. Over time as the GAC in the lead tank needs replacement, the lag tank becomes the lead tank to remove PFAS. The former lead tank is then equipped with fresh GAC and placed in the lag position. With this configuration, **PFAS will always be able to be removed.** We completed the GAC replacement in our first tank in January 2023, which is the first GAC replacement since the system became operational, underscoring the GAC technology's efficiency and effectiveness in removing PFAS. NASA is responsible for operating and maintaining the system and doing all testing to ensure it continues to operate as it should.

Now that the Town is once again using all its deep and shallow water wells for production, the Town's water no longer needs to be supplemented. If ever needed, the capability for NASA to supplement the Town's water remains in place.

Groundwater Monitoring

As part of NASA's ongoing investigation and response efforts, and in coordination with federal and state agencies, we installed a number of monitoring wells (not for drinking

water) in both the shallow and deep groundwater along the perimeter of the main base facility. Monitoring these wells helps to ensure a better understanding of the groundwater quality at the main base. In addition, six observation wells were installed around the main base drinking water supply wells. Since October 2017, NASA has sampled a total of 23 wells quarterly, except for the period between March to June 2020, when onsite work was temporarily suspended under NASA's COVID-19 response framework. The quarterly sampling results are reported to the appropriate federal, state and local agencies and remain part of our investigation activities to guide any possible next steps to protect human health and the environment.

Site Investigation Activities

Following initial testing in 2017, which showed the presence of PFOA and PFOS in shallow and deep wells, a site investigation was conducted to determine the nature and extent of PFAS in the environment at Wallops, including possible source areas. The site investigation efforts are based on a comprehensive work plan that was approved by federal and state health and environmental officials in March 2019.

Samples collected during the investigation confirm the presence of PFAS in areas of past use, such as the former firefighter training area and the site of an airplane crash at the facility. PFAS was also detected in outfalls and tributaries of Little Mosquito Creek and Jenney's Gut within the main base. In July 2019, NASA presented initial site sampling results to federal and state environment and health officials and discussed next steps. As a result, NASA conducted additional sampling of surface water and sediment in mid-July 2019. The additional samples showed some PFAS in low levels in surface water samples in Little Mosquito Creek and Jenney's Gut near Wallops' main base boundary. There are currently no federal or state surface water standards. NASA briefed federal and state health officials on all sampling results, and with their concurrence, determined that the next appropriate step was to conduct quarterly sampling to monitor surface water, which is not a source for drinking water. While there are still no existing federal or state surface water standards, NASA is conducting studies to evaluate actions to contain or remove possible source areas. We will continue to monitor EPA's progress in implementing their PFAS Strategic Roadmap as well as any other activites that would provide guidance for NASA's investigation and remediation efforts.

NASA completed a site investigation report for the main base in November 2020, linked here. In turn, NASA developed a workplan to implement agency recommendations contained within the report. NASA began the investigation activities in August 2021 when the workplan was approved by federal and state health and environmental officials. NASA completed investigation activities in February 2022 and is currently evaluating the data and preparing a report summarizing the results.

In addition to sampling on Wallops' main base, NASA developed a workplan to expand site investigation sampling on Wallops Island. Initial sampling conducted near the former fire station on Wallops Island showed detections of PFAS. The workplan was approved by federal and state health and environmental agencies. NASA began the site investigation activities in November 2021 and completed the sampling activities in December 2021. ***Importantly, there are no private wells or drinking water sources on Wallops Island.*** Drinking water on Wallops Island is provided by two wells on

Wallops' Mainland. NASA sampled these wells as part of the Wallops Island site investigation sampling and no PFAS were detected. NASA submitted a draft report summarizing the results of this investigation to federal and state health and environmental agencies in November 2022.

NASA continues to share all sampling plans and results with local officials, EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), Virginia Department of Environmental Quality (VDEQ) and VDH to determine the need for any additional actions.

We will continue to provide updates on our website as new information becomes available. To read past Wallops' updates on PFAS Testing and additional background information, see: https://www.nasa.gov/content/information-on-wallops-pfas-testing

For more information on NASA's ongoing efforts, contact Jeremy Eggers, Wallops Office of Communications, at 757-824-2958 or via email at Jeremy.l.eggers@nasa.gov.

Additional Information, Fact Sheets, and Health Information

EPA announced its PFAS Strategic Roadmap in October 2021. The roadmap sets timelines by which EPA plans to take specific actions and commits to new polices to safeguard public health and protect the environment. NASA will continue to track EPA's work and apply methods as they become available. In May 2022, EPA added five PFAS chemicals for a total of six PFAS chemicals to a list of risk-based values that help EPA determine if response or remediation activities are needed. We will use these risk-based values to guide any possible next steps to protect human health and the environment. More information about these values is available at https://www.epa.gov/newsreleases/epa-adds-five-pfas-chemicals-list-regional-screening-and-removal-management-levels. On June 15, 2022, EPA issued interim health advisories for PFOS and PFOA and final health advisories on PFBS, and a class of PFAS known as GenX chemicals.

ATSDR is the agency responsible for evaluating health concerns. ATSDR evaluated information on the potential health effects for exposures to perfluoroalkyls and released a final toxicological profile in May 2021, available here https://www.atsdr.cdc.gov/toxprofiledocs/index.html. ATSDR is currently considering an update to this toxicological profile to incorporate any new scientific data since the 2021 document.

NASA continues to track ATDSR's work on a multi-site sampling and exposure study at sites located near Department of Defense facilities. That work is complete and reports are availbe for individual sites and a summary of all sites here. NASA will continue to track various state agencies as they work to develop guidance on levels of PFAS in the environment.

In response to a request, ATSDR agreed to develop a health consultation document to estimate potential historical PFAS exposure levels for the Town of Chincoteague. According to ATSDR, that draft health consultation is expected to be completed in 2023. For more information on their efforts, contact Dr. Karl Markiewicz, Senior Toxicologist, at 215-814-3149 or via email at kvm4@cdc.gov

Additional information on PFAS is available from the Agency for Toxic Substances and Disease Registry at: https://www.atsdr.cdc.gov/pfas/index.html. EPA also has a dedicated PFAS website at: https://www.epa.gov/pfas.

For information about health effects of PFAS, contact:

- Dr. Karl Markiewicz, Senior Toxicologist, Agency for Toxic Substances and Disease Registry, Philadelphia, PA, at 215-814-3149 or via email at kvm4@cdc.gov
- Dr. Dwight Flammia, Virginia Department of Health, Division of Environmental Epidemiology, at 804-864-8127 or via email at Dwight.Flammia@vdh.virginia.gov
- Jon Richardson, Eastern Shore Health District, Virginia Department of Health, at 757-302-4271, or via email at jon.richardson@vdh.virginia.gov